



Summary of Offline Sessions at the Week in the North

Peter Shanahan
NOvA WITN Closing Session
May 25, 2006



Reconstruction



SoCal proto-Framework

- Caius Howcroft
- A means to get physics results from existing simulations on the timescale of the TDR
 - ▶ In C++ , not using old MINOS-based FORTRAN reconstruction
 - ▶ Not intended as formal framework
- Elements:
 - ▶ Core libraries: data format/storage, geometry, connection map, units/conventions, event display
 - ▶ User libraries (in progress): detector response (photon transport, digitization simulation) , nu_e analysis

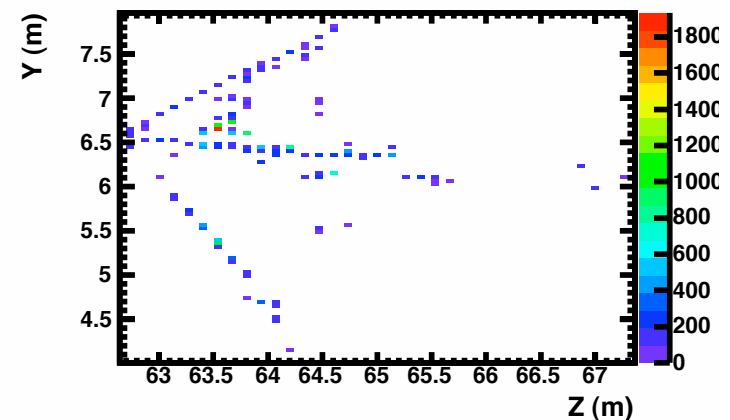
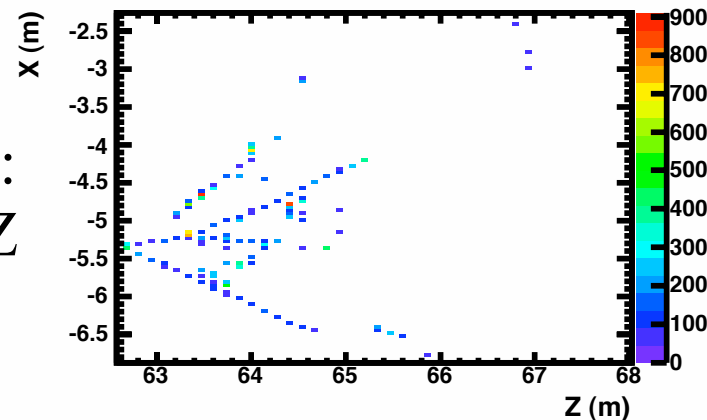


ν_e Ana: SubShowers

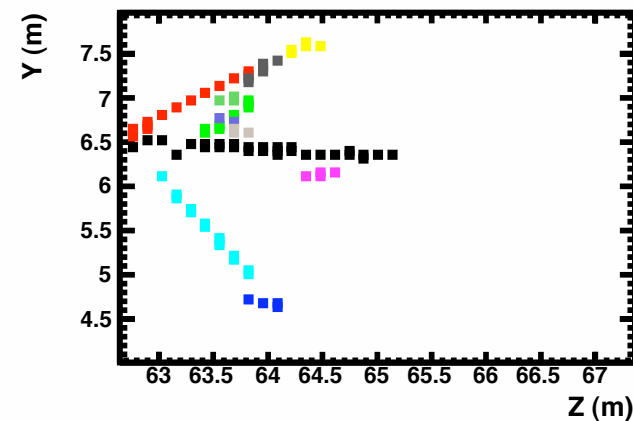
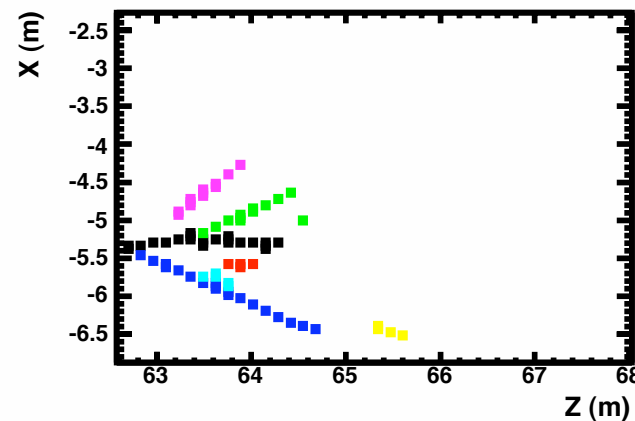
- From MINOS: Hai Zheng

Work in Progress:
Link X-Z and Y-Z
views into 3D
objects

“Raw Data”



Sub Showers



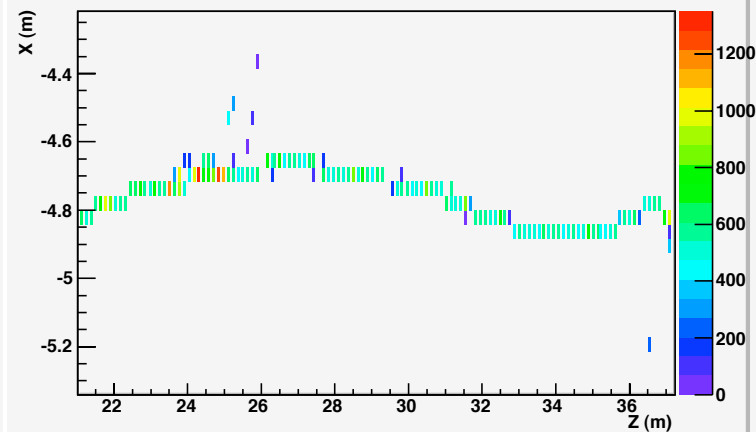


Sub-Shower with ν_μ CC

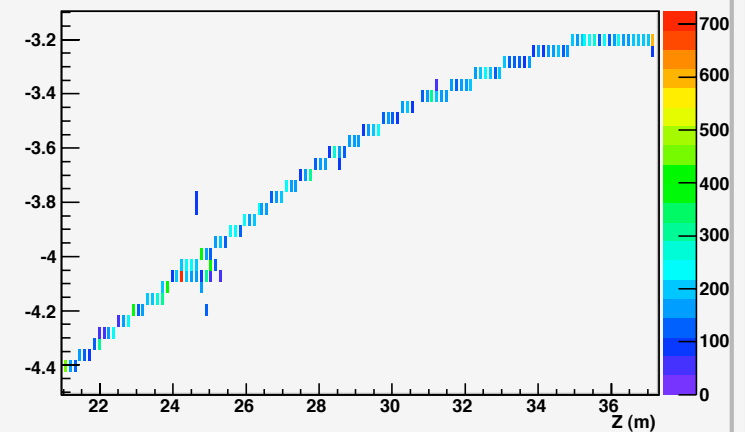
Doesn't work
well on long
muon tracks:

additional
algorithms will
be needed

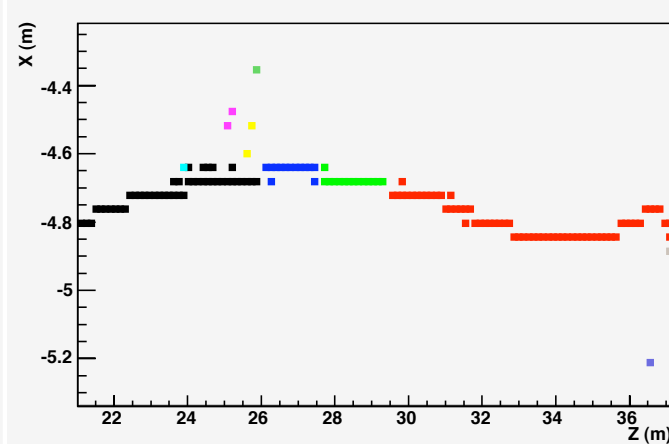
“Raw Data”



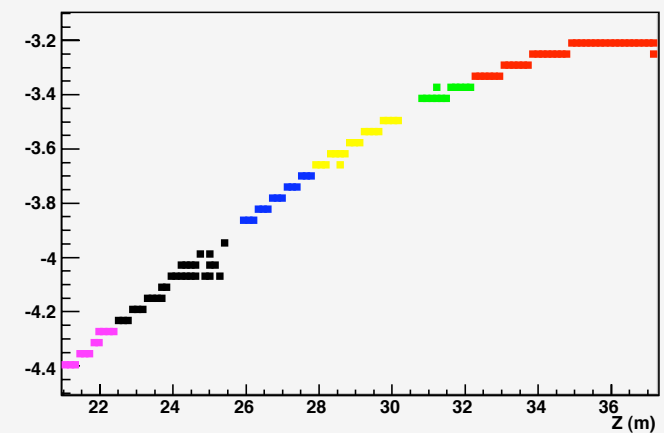
all strips in Y



Sub Showers



all strips in Y



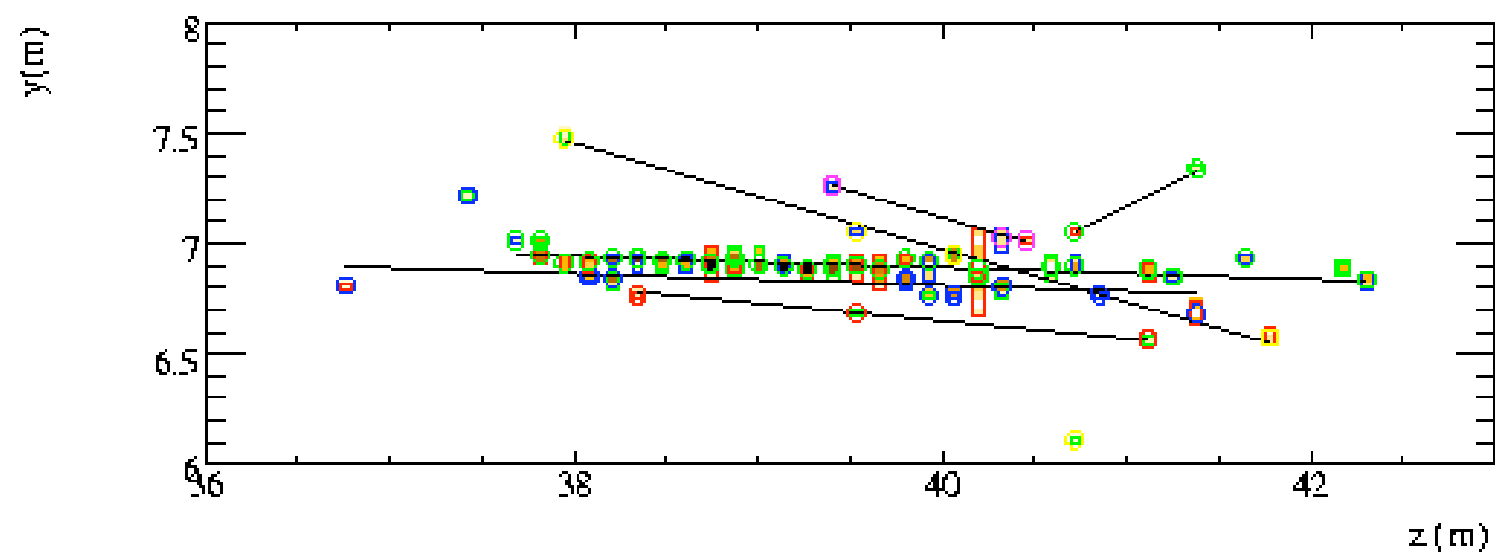
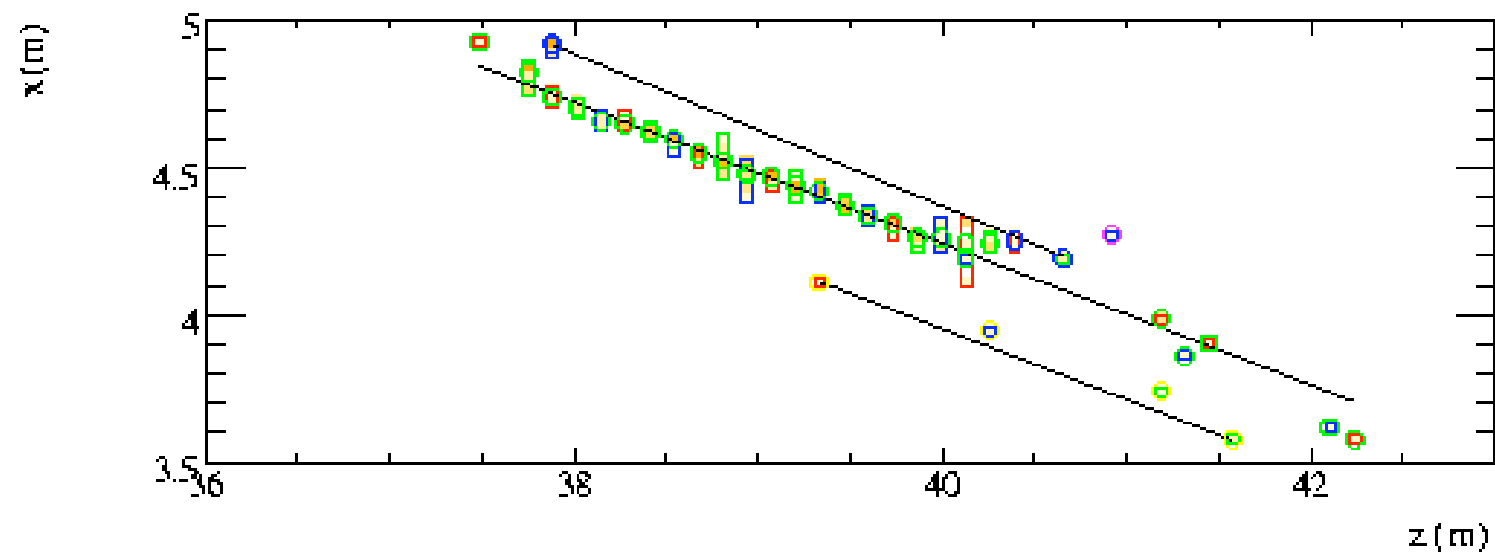


SoCal User

- Mark Messier:
 - ▶ User test of SoCal with basic reconstruction classes
 - ▶ NovaHitCell
 - ▶ NovaView: collection of NovaHitCells with facility for looping, organizing
 - ▶ Hough tracker
 - ▶ In a very short time, Mark was able to do basic track finding



Example





DataBase

- Early thoughts from Jon Paley
- Emphasis for near future will be on hardware production
- Calibration, Slow DAQ, Run Monitoring, etc., will follow
- Leaning toward mysql
 - ▶ Open source, stable, well documented
- L2 Managers: Please contact Jon: jpaley@fnal.gov



Reconstruction Tasks

- With shorter-term goals in mind:
 - ▶ “Shorter term”: work backwards from CD-2 review
 - More or less finished by August meeting....
 - ▶ Continued progress on SoCal
 - More flexible and accurate detector response modeling
 - Goal is Physics studies for TDR/Improved selection efficiency
 - ▶ NearDet overlap issue:
 - Digit timing, event time structure
 - Spill record “slicing”: breaking record into proto-events before reconstruction



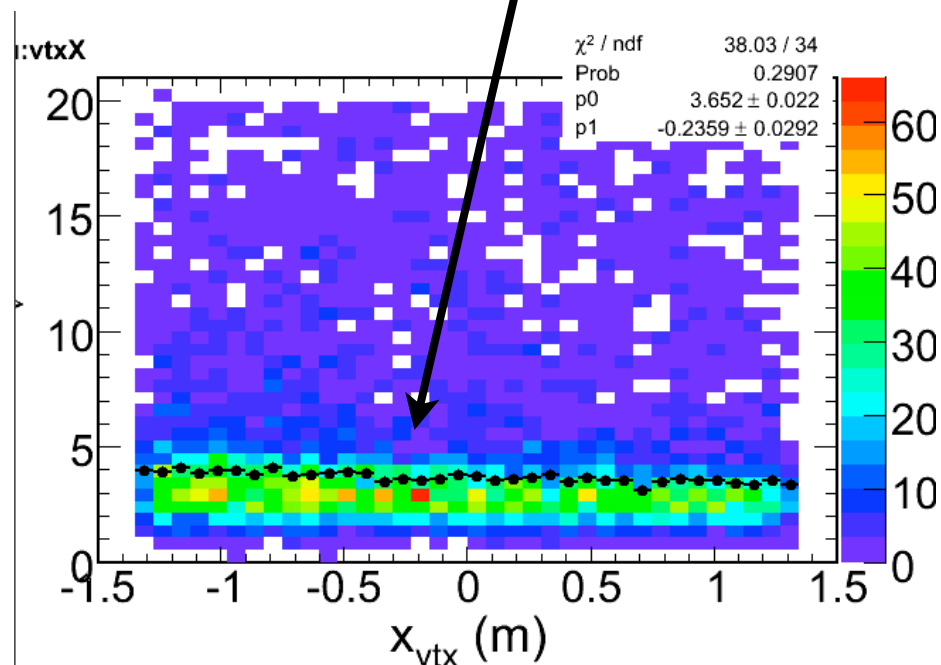
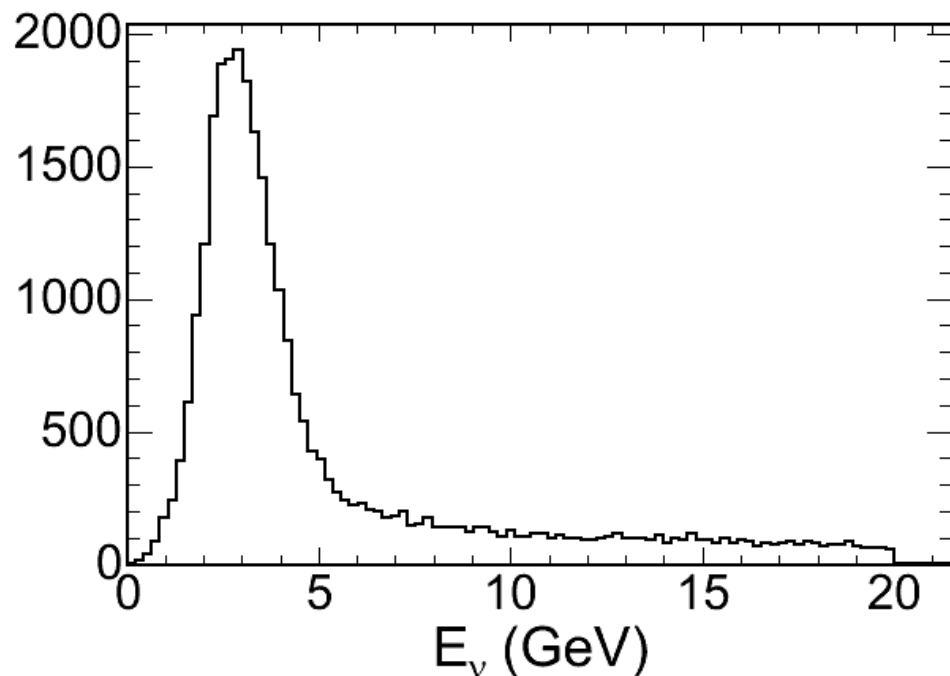
Simulations



Near Detector

- Brian Rebel:

- ▶ Modeled detector at position “38+50”
- ▶ Correct CDR geometry, including muon catcher

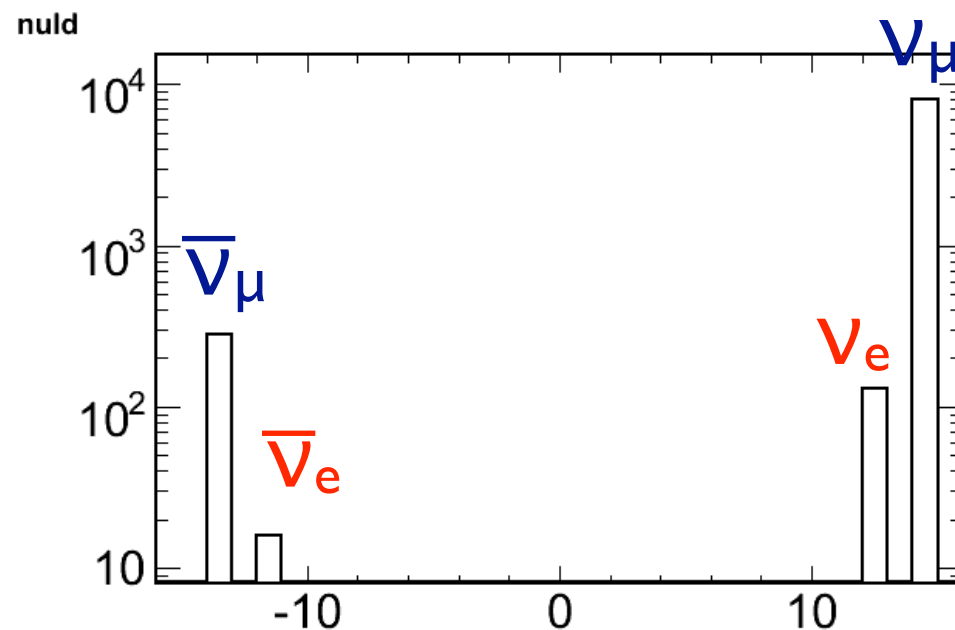


Detector doesn't have “an off-axis angle” - it has a range
Mean energy varies across detector



NearDet ν 's

- Neutrino Flavor Composition
 - ▶ Brian will start to use SoCal reconstruction

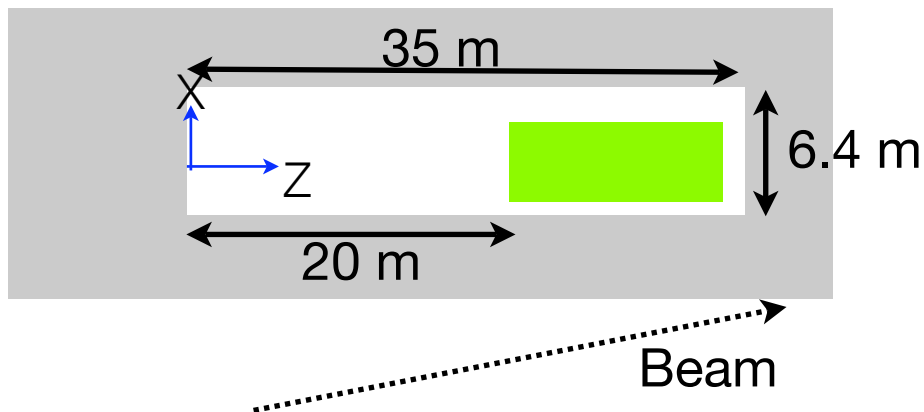




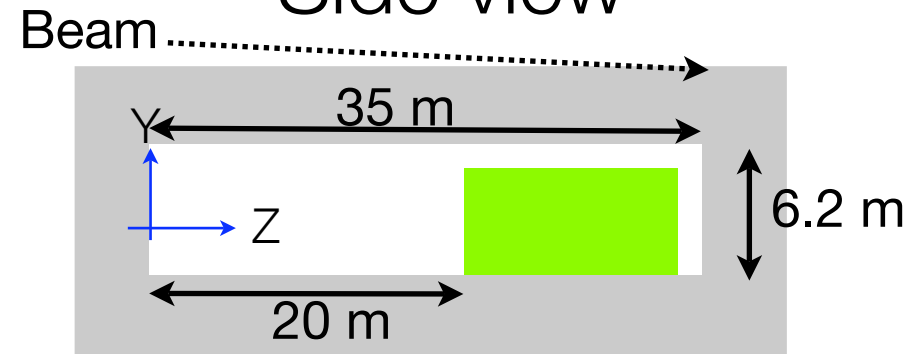
Near Detector Rock Events

- Alysia Marino

Top view



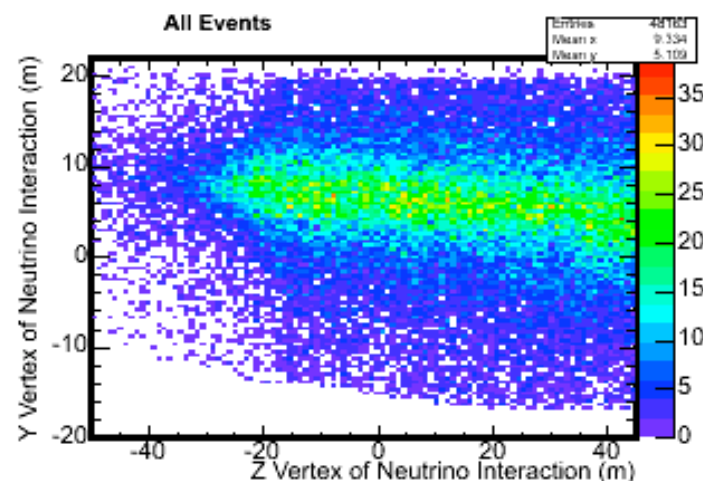
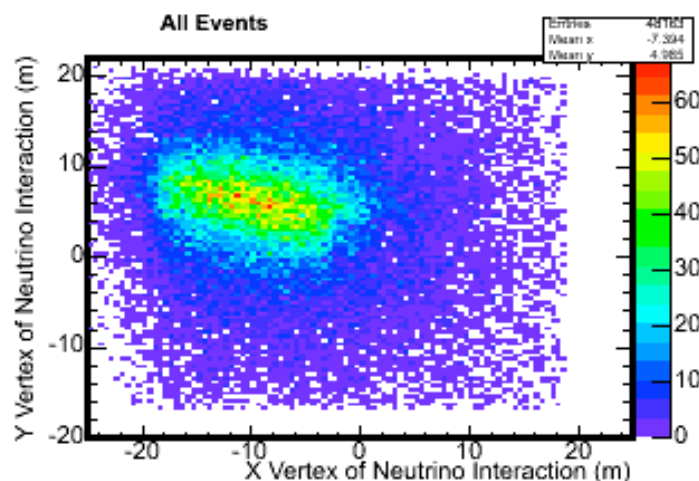
Side view



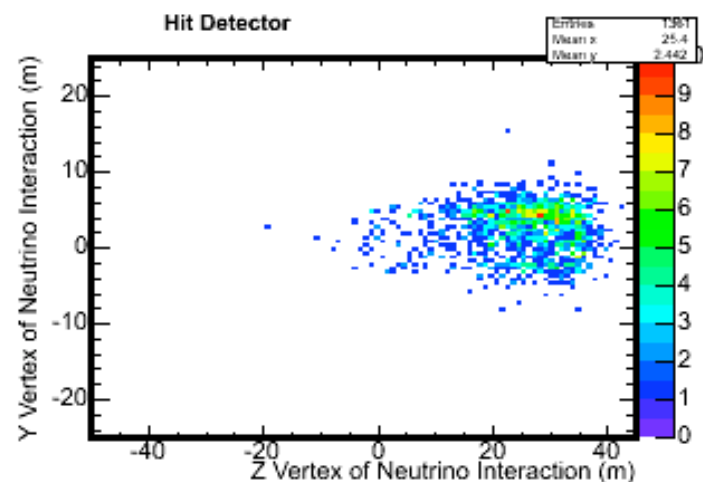
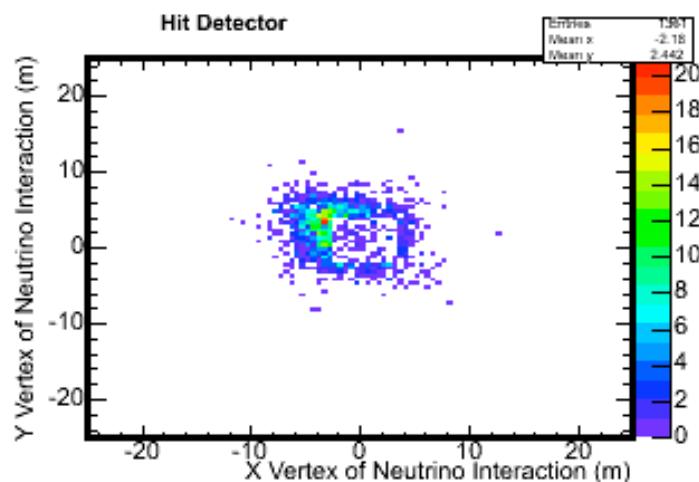


Rock events

Interactions
Generated



Interactions
that Hit
Detector

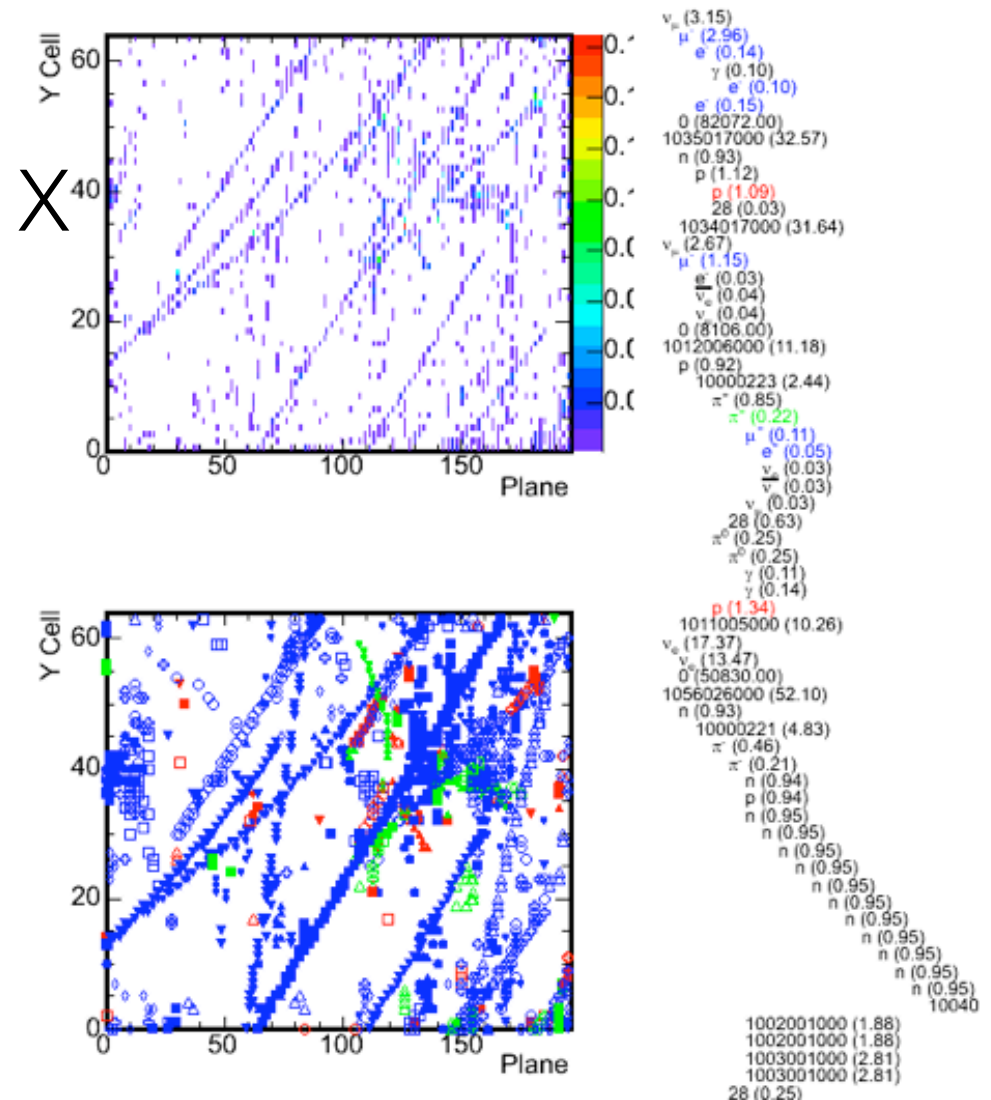
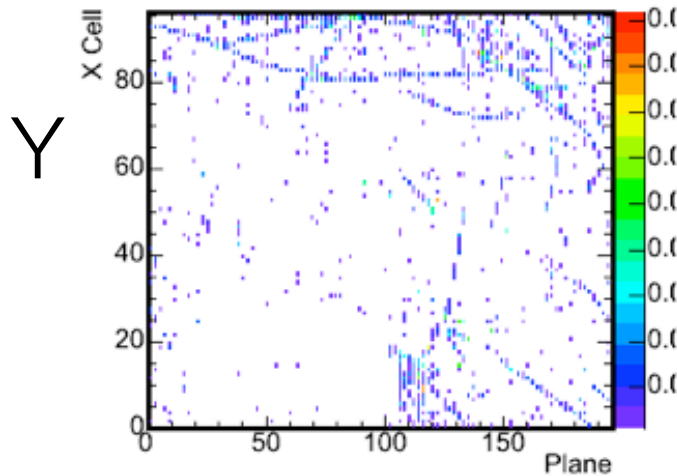


With 6.0×10^{13} POT spill, expect ~ 25 rock events leaving
 > 10 hit cells with > 1 MeV each

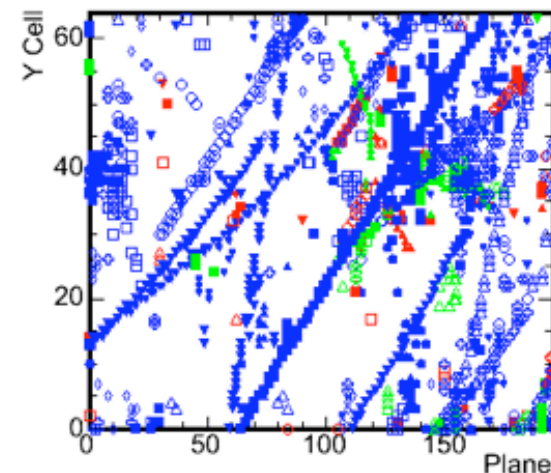
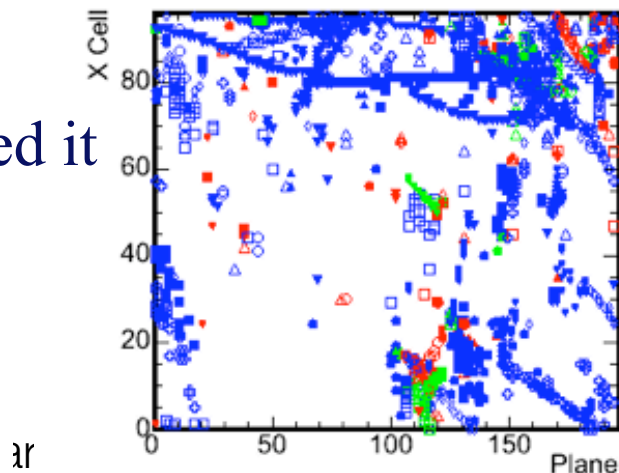


Overlaid Spills

- Mean of 162 Rock and 8.3 Detector events



An example spill

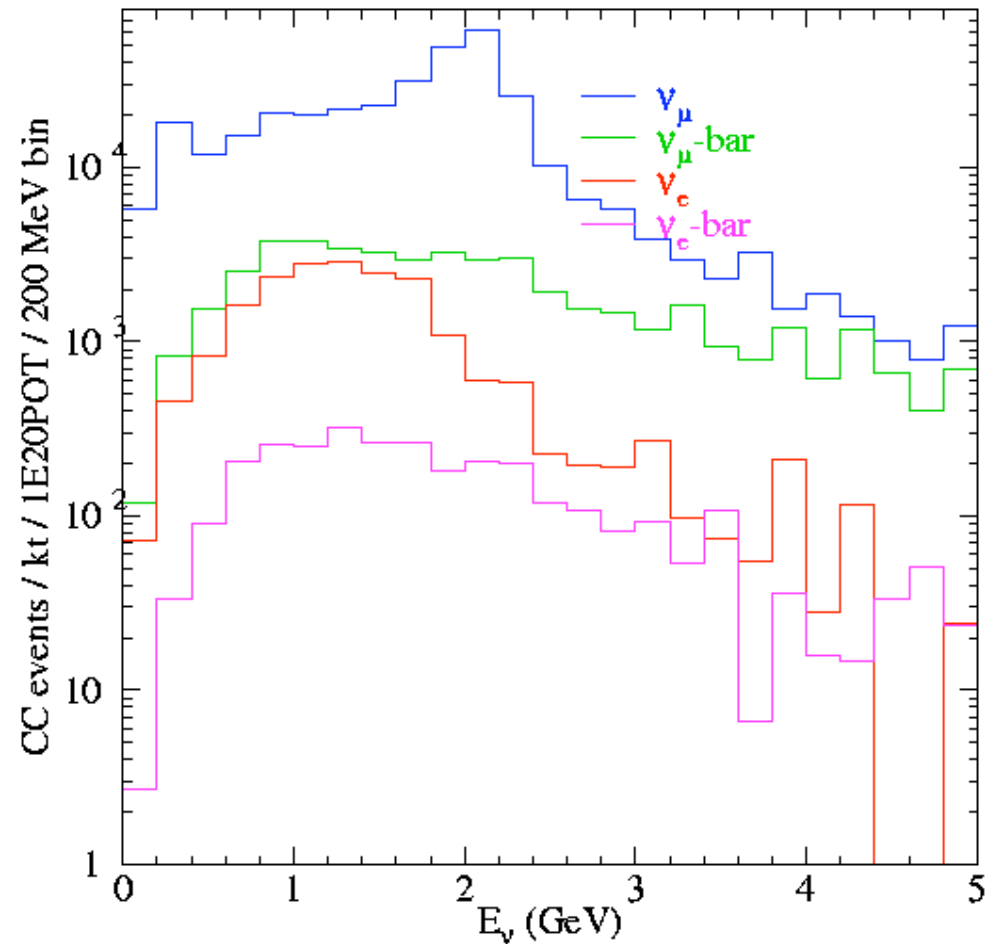


Alysia will feed it to SoCal!



Fluxes Update

- Mark Messier
- “75 mrad” used for IPND Surface location in CDR is incorrect - new fluxes generated
- New Fluxes:
 - ▶ (LE x ME) x (Ash River x Surface Building x NearDet) x (n x nu-bar)



<http://enrico1.physics.indiana.edu/messier/off-axis/spectra>



Overburden

- Profuse apologies to Kevin Lee!
 - ▶ The nasty FNAL spam filter interfered with his update, and will have to be re-educated
- Kevin is continuing to study the appearance of charged particles associated with photons interacting in the overburden.



Simulation Tasks

- Continue with Near Overlap issues
- More MC
 - ▶ Far: add cosmic overlays
- NearDet/IPND
 - ▶ Full IPND simulation
 - ▶ Optimization of muon ranger depth
- Overburden
 - ▶ Critical item - needs more than 1 group working on it



General Tasks

- Define data structures/requirements
 - ▶ Prerequisite to defining formal framework
- Overall lists of goals, tasks, and responsibilities